

IN THE CLAIMS

1. A signal receiver having calibration for a frequency dependent I/Q phase error, comprising:

5        a calibration tone generator for generating a calibration tone for providing in-phase (I) and quadrature phase (Q) tone components;

I and Q filters for filtering said I and Q calibration tones for issuing filtered I and Q output tones having an undesired frequency dependent I/Q phase error, at least one of the I and Q filters having an adjustable characteristic; and

10      a correlator for cross correlating said I and Q output tones for providing a cross correlation feedback signal, said correlation feedback signal used for adjusting said adjustable characteristic for reducing said frequency dependent I/Q phase error.

2. The receiver of claim 1, wherein:

15      said correlation feedback signal adjusts said adjustable characteristic for minimizing a phase difference between said I output tone and said Q output tone.

3. The receiver of claim 1, wherein:

20      said calibration tone has a frequency near to a cutoff frequency for said I and Q filters.

4. The receiver of claim 1, wherein:

25      the I and Q filters include an I analog filter for providing said I output tone and a Q analog filter for providing said Q output tone; and

      said adjustable characteristic is a cutoff frequency of at least one of said I

25      and Q analog filters.

5. The receiver of claim 4, wherein:

5                   said cutoff frequency is adjusted by frequency scaling at least one pole and at least one zero of said at least one of said I and Q analog filters by a certain common factor.

5       6. The receiver of claim 4, wherein:

                  said certain common scale factor is adjusted by adjusting channel resistance of at least one transistor.

7. The receiver of claim 1, wherein:

10               the I and Q filters include I and Q allpass filters for providing said I and Q output tones; and

                  said adjustable characteristic is a phase delay of at least one of said I and Q allpass filters.

15       8. The receiver of claim 7, wherein:

                  said phase delay is adjusted by frequency scaling at least one pole by a certain factor and frequency scaling at least one zero by an inverse of said certain factor in said at least one of said I and Q allpass filters.

20       9. The receiver of claim 1, further comprising:

                  a frequency downconverter including a local oscillator for providing a complex LO signal and I and Q frequency downconverters using said LO signal for downconverting an input signal having a carrier frequency to I and Q signal components; and wherein:

25               the calibration tone generator issues a calibration signal as said input signal having a certain frequency offset from said carrier frequency for providing said I and Q calibration tone components in place of said I and Q signal components.

10. A method for correcting frequency dependent I/Q phase error, comprising:

generating a calibration tone for providing in-phase (I) and quadrature phase (Q) tone components;

filtering said I and Q calibration tones for providing filtered I and Q output tones having undesired frequency dependent I/Q phase error;

5 cross correlating said I and Q output tones for providing a cross correlation feedback signal; and

adjusting an adjustable characteristic of at least one of the I and Q filters with said correlation feedback signal for reducing said frequency dependent I/Q phase error.

10

11. The method of claim 10, wherein:

the step of adjusting said adjustable characteristic includes minimizing a phase difference between said I output tone and said Q output tone.

15

12. The method of claim 10, wherein:

said calibration tone has a frequency near to a cutoff frequency for said I and Q filters.

13. The method of claim 10, wherein:

20

the step of filtering said I and Q calibration tones includes filtering said I calibration tone component with an I analog filter for providing said I output tone; and filtering said Q calibration tone component with a Q analog filter for providing said Q output tone; and the step of adjusting said adjustable characteristic includes adjusting a cutoff frequency of at least one of said I and Q analog filters.

25

14. The method of claim 13, wherein:

the step of adjusting said cutoff frequency includes frequency scaling at least one pole and at least one zero of said at least one of said I and Q analog filters by a certain common factor.

30

15. The method of claim 13, wherein:

    said step of frequency scaling includes adjusting channel resistance of at least one transistor.

5     16. The method of claim 10, wherein:

    the step of filtering said I and Q calibration tone components includes passing the I and Q calibration tones through I and Q allpass filters for providing said I and Q output tones; and the step of adjusting said adjustable characteristic includes adjusting a phase delay of at least one of said I and Q allpass filters.

10

17. The method of claim 16, wherein:

    the step of adjusting said phase response includes frequency scaling at least one pole by a certain factor and frequency scaling at least one zero by an inverse of said certain factor in said at least one of said I and Q allpass filters.

15

18. The method of claim 10, further comprising:

    frequency downconverting an input signal having a carrier frequency with a complex LO signal to I and Q signal components; and wherein:

20     the step of generating said calibration tone includes issuing a calibration signal as said input signal having a certain frequency offset from said carrier frequency for providing said I and Q calibration tone components in place of said I and Q signal components.